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## CLAIMS

1. A cooling system, comprising:  
2 an evaporator;  
a suction line for refrigerant output from said evaporator;  
4 a two stage compressor adapted to compress said refrigerant from said  
suction line, said compressor having  
6 a first stage receiving said gaseous refrigerant from said suction  
line and outputting compressed gaseous refrigerant to an  
8 inter-cooler, and  
a second stage receiving said gaseous refrigerant from said  
10 inter-cooler and outputting compressed gaseous  
refrigerant;  
12 a gas cooler integrated with said inter-cooler, said gas cooler adapted to  
cool compressed refrigerant discharged from said compressor  
14 second stage;  
a capillary tube adapted to carry cooled refrigerant from said gas cooler  
16 to said evaporator;  
wherein said suction line and said capillary tube are disposed adjacent  
18 each other for heat exchange therebetween.

2. The cooling system of claim 1, wherein said capillary tube  
2 wraps around said suction line.

3. The cooling system of claim 1, wherein said refrigerant  
2 comprises carbon dioxide.

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4. The cooling system of claim 1, wherein said cooling  
system is transcritical.

5. A cooling system, comprising:  
an evaporator having an air side on which water condensation occurs;  
a pan adapted to collect water condensate from the air side of said  
evaporator;  
a suction line for refrigerant output from said evaporator;  
a compressor receiving said refrigerant from said suction line and  
adapted to compress said refrigerant;  
a gas cooler adapted to cool compressed refrigerant discharged from  
said compressor;  
a refrigerant tube adapted to carry cooled refrigerant from said gas  
cooler through said pan in heat exchange relation with said  
collected water condensate;  
a capillary tube adapted to carry cooled refrigerant from said refrigerant  
tube to said evaporator;  
wherein said suction line and said capillary tube are disposed adjacent  
each other for heat exchange therebetween.

6. The cooling system of claim 5, wherein said refrigerant  
comprises carbon dioxide.

7. The cooling system of claim 5, wherein said cooling  
system is transcritical.

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8. A cooling system, comprising:

2 an evaporator;

a suction line for refrigerant output from said evaporator;

4 a compressor receiving said refrigerant from said suction line and  
adapted to compress said refrigerant;

6 a gas cooler adapted to cool compressed refrigerant discharged from  
said compressor;

8 a capillary tube adapted to carry cooled refrigerant from said gas cooler  
to said evaporator;

10 a sensor adapted to sense one of external air temperature, suction line  
temperature, or suction line pressure; and

12 a controller adapted to selectively turn said compressor on and off  
based on the one temperature or pressure sensed by said  
14 sensor;

16 wherein said suction line and said capillary tube are disposed adjacent  
each other for heat exchange therebetween.

9. The cooling system of claim 8, wherein said controller

2 turns said compressor on to compress said gaseous refrigerant only when said  
sensor senses external air temperature above a selected level.

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10. A cooling system, comprising:

2 an evaporator;

4 a suction line for refrigerant output from said evaporator, said suction  
line including first and second substantially parallel straight  
6 straight cylindrical portions connected in series whereby said second  
straight cylindrical portion receives refrigerant from said first  
straight cylindrical portion;

8 a compressor receiving said refrigerant from said suction line and  
adapted to compress said refrigerant;

10 a gas cooler adapted to cool compressed refrigerant discharged from  
said compressor; and

12 a capillary tube adapted to carry cooled refrigerant to said evaporator,  
said capillary tube including first and second helically wound  
14 portions connected in series whereby said second helically  
wound portion receives cooled refrigerant from said first helically  
16 wound portion, said first helically wound portion being wrapped  
around said suction line second straight cylindrical portion and  
18 said second helically wound portion being wrapped around said  
suction line first straight cylindrical portion.

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2 11. The cooling system of claim 10, further comprising a  
bypass safety valve between an inlet to said first helically wound portion of said  
4 capillary tube and an outlet from said second helically wound portion of said  
6 capillary tube, said bypass safety valve opening responsive to a pressure  
differential between said inlet to said first helically wound portion of said  
capillary tube and said outlet from said second helically wound portion of said  
capillary tube.

2 12. The cooling system of claim 10, wherein said suction line  
includes a U-shaped portion connecting said first and second cylindrical  
portions of said suction line.

2 13. The cooling system of claim 10, further comprising an  
accumulator between said first and second cylindrical portions of said suction  
line.

2 14. The cooling system of claim 10, wherein said refrigerant is  
CO<sub>2</sub> and said capillary tube is an expansion device for said cooled CO<sub>2</sub>  
refrigerant.

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15. A cooling system, comprising:

2 an evaporator;

4 a suction line for refrigerant output from said evaporator, said suction  
line including

6 a straight portion substantially cylindrical about an axis, and  
an accumulator between said evaporator and said suction line  
straight portion, said accumulator including

8 a phase separation chamber having an input for  
refrigerant from said evaporator and an outlet for  
10 gaseous refrigerant from which oil and liquid  
droplets have been separated in said phase  
12 separation chamber,

14 an accumulator including a discharge opening for  
discharging oil to return said oil to said system,  
a vertical pipe between said phase separation chamber  
16 and said accumulator;

18 a compressor receiving said gaseous refrigerant from said suction line  
and adapted to compress said gaseous refrigerant;

20 a gas cooler adapted to cool compressed refrigerant discharged from  
said compressor; and

22 a capillary tube adapted to carry cooled refrigerant to said evaporator,  
said capillary tube including a portion helically wound around a  
24 central axis generally coinciding with said suction line straight  
portion axis;

26 wherein said suction line and said capillary tube are disposed adjacent  
each other for heat exchange therebetween.

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16. The cooling system of claim 15, further comprising a  
second vertical pipe between said phase separation chamber and said  
accumulator, said second vertical pipe adapted to hold a selected volume of  
refrigerant charge.

17. A cooling system, comprising:  
an evaporator;  
a suction line for refrigerant output from said evaporator;  
a compressor receiving said refrigerant from said suction line and  
adapted to compress said refrigerant;  
a gas cooler adapted to cool compressed refrigerant discharged from  
said compressor;  
a capillary tube adapted to carry cooled refrigerant from said gas cooler  
to said evaporator; and  
a bypass tube around said capillary tube, said bypass tube including an  
inter-bleeding valve adapted to open responsive to a pressure  
differential above a selected level in said refrigerant discharged  
from said gas cooler;  
wherein said suction line and said capillary tube are disposed adjacent  
each other for heat exchange therebetween.

18. The cooling system of claim 17, wherein said selected  
level is above normal operating pressures.

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19. The cooling system of claim 17, wherein said refrigerant is  
carbon dioxide.

20. A cooling system, comprising:  
an evaporator having an air side on which water condensation occurs;  
a pan adapted to collect water condensate from the air side of said  
evaporator;  
a suction line for refrigerant output from said evaporator;  
a two stage compressor adapted to compress said refrigerant, said  
compressor having  
a first stage receiving said refrigerant from said suction line and  
outputting compressed refrigerant to an inter-cooler, and  
a second stage receiving said refrigerant from said inter-cooler  
and outputting compressed refrigerant;  
a gas cooler integrated with said inter-cooler, said gas cooler adapted to  
cool compressed refrigerant discharged from said compressor  
second stage;  
a refrigerant tube adapted to carry cooled refrigerant from said gas  
cooler through said pan;  
a capillary tube adapted to carry cooled refrigerant from said gas cooler  
to said evaporator;  
a bypass tube around said capillary tube, said bypass tube including an  
inter-bleeding valve adapted to open responsive to a pressure  
differential above a selected level in refrigerant discharged from  
said refrigerant tube;



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24 a sensor adapted to sense one of air temperature, suction line  
temperature, or suction line pressure; and  
26 a controller adapted to selectively turn said compressor on and off  
based on the a temperature or pressure sensed by said sensor;  
28 wherein said suction line and said capillary tube are disposed adjacent  
each other for heat exchange therebetween.

2 21. The cooling system of claim 20, wherein said capillary tube  
wraps around said suction line.

2 22. The cooling system of claim 20, wherein said refrigerant  
comprises carbon dioxide.

2 23. The cooling system of claim 20, wherein said cooling  
system is transcritical.